

マスタテーブルの構成例

(A) 共通部品情報マスタテーブル

共通部品番号	版 数	設 計 者	設 計 日	管理グループ	最終更新日
CA12345-6789	001	970001	970430	1432	970430
CA12345-6789	002	970002	970501	1432	970501
CA22222-1234	003	970003	960501	2345	960501

(B) 利用者権限マスタテーブル

ログインID	ログイン パスワード	アクセス グループ	メールアドレス	役 割	役割No.
L1234	*****	4321	yasue@fj.co.jp	設計者	15
L1111	*****	4444	foo@fj.co.jp	承認者	12

(C) モデルデータ格納先マスタテーブル

アクセス グループ	アクセス ホスト	アクセスボリューム	アクセスホスト - i p アドレス
4321	bulk-1	/usr/tmp/4321	133.111.23.10
4444	bulk-2	/usr/tmp/4444	133.161.11.11
5432	bulk-3	/opt2/cad/data	133.161.12.12

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(21)Application number : 10-323119 (71)Applicant : NIPPON STEEL CORP
(22)Date of filing : 13.11.1998 (72)Inventor : KOJIMA KAZUHIITO
YOSHIKURA MITSURU
UESUGI HIRONORI

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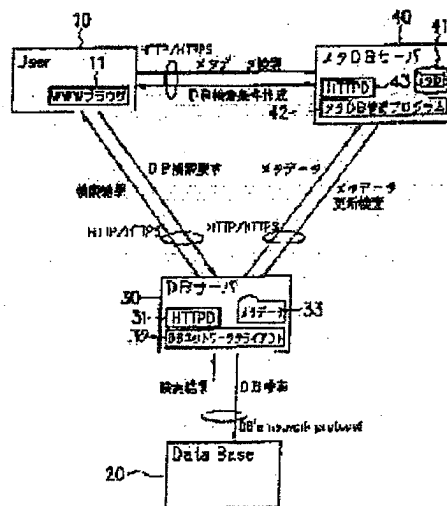
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(54) DATA BASE SYSTEM, DATA BASE RETRIEVING METHOD AND RECORDING MEDIUM

... (57) Abstract:

PROBLEM TO BE SOLVED: To provide a system capable of easily retrieving data without allowing a user to be conscious of the distribution of data base(DB) servers.

SOLUTION: Meta data related to real data stored in one or more DBs 20 are collectively managed by one meta DB server 40 and meta data coincident with a retrieving request are extracted by retrieving the server 40. Even when plural DBs 20 and plural DB servers 30 for managing these DBs 20 exist on a network, all meta data coincident with a retrieving request can be extracted by retrieving the server 40 without restricting which DB 20 corresponds to a certain meta data, so that even when the existing positions of distributed DBs 20 and DB servers 30 are not known, all data matched with the retrieving request can be obtained from one server 40.



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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] Especially this invention is used for the retrieval system which discovers desired data from two or more decentralized databases about database system, a database search method, and a record medium, and is suitable.

[0002]

[Description of the Prior Art] What consisted of one large-sized computer, such as a mainframe, is shifting to the distributed system which consists of two or more workstations or personal computers etc. conventionally with high-performance-izing of the computer in recent years in recent years. By making it distributed process input output equipment, there is a merit that development and maintenance of a system become comparatively easy. The so-called Internet is mentioned as an example of distributed system.

[0003] Two or more computers are distributed all over the world as a server or a client, and, so to speak, each consists of the Internet as one big database (it is hereafter described as DB). And these DB(s) are received, text information, image information, etc. are registered by the protocol of shoes, or reading appearance is carried out. Moreover, it is in the inclination for DB to be decentralized, in the system treating the data of not only the Internet such but an immense amount.

[0004]

[Problem(s) to be Solved by the Invention] by the way, the information on the request from DB decentralized in this way -- reading appearance -- when that is right, retrieving required information needs very much time amount and many efforts from all the servers that manage these DB(s). That is, since it did not understand where [of DB which the information which it is going to read is decentralizing] it would be stored, the user accessed in order the server prepared by corresponding for every DB, and he had the problem that retrieval had to be repeated and had to be performed until the information on desired was found.

[0005] Moreover, if the user does not grasp all the whereabouts (address information, such as URL (Uniform Resource Locator) of the Internet) of DB server, it is impossible to retrieve required information from all servers. However, decentralized DB server may perform registration and deletion of data continuously, and connection and cutting to the network of the DB server itself may also be performed continuously. Therefore, there was also a problem that it was very difficult for all users to grasp these things, and exact information could not be retrieved.

[0006] In order to cancel such inconvenient, in the Internet, the address search service called a search engine exists. The search engine is collecting URL information with automatic or hand control, for example, can search required URL by the input of a keyword. If an example is given and it will search about the keyword "a patent", URL of the server relevant to a patent will be outputted.

[0007] However, RDBMS (relational DB managerial system) built in the server of a retrieval place was not able to be searched with this search engine only by retrieving the URL information on DB server. Therefore, when searching RDBMS etc., a user searches the server which he wishes by the search engine first, looks at the result of retrieval, and connects with a desired server. Subsequently, the information in the DB will be retrieved using the search method of DB corresponding to the server concerned.

[0008] As mentioned above, when desired data came to hand conventionally and DB which stored

various data was decentralized, many time amount and efforts were needed for retrieval of the data. [0009] Furthermore, usually in Above RDBMS, the number of the maximum columns which can be held in one table has a limit. In creating the table of 257 or more columns in RDBMS in which was followed, for example, the number of the maximum columns had a limit of 256, by appearance, it is building the database as one table (view) by one table's creating two or more tables (real table) of 256 or less columns, and setting relation as them.

[0010] For example, one view X shown in drawing 13 consists of three real tables A, B, and C, and relation is set up among these three real tables A, B, and C. That is, the consistency between three independent tables is taken by storing the same data of each other in the columns a1, b1, and c1 used as the key of each fruit tables A, B, and C, and constituting the column x1 of View X by using these columns a1, b1, and c1 as a join key. That is, the column x1 of View X is common in each of the three above-mentioned columns a1, b1, and c1.

[0011] Moreover, the columns a2, a3, and a4 of the real table A are the columns b2, b3, b4, and b5 of the real table B to column x2 of View X, and x3 and x4. Columns x5, x6, x7, and x8 of View X Columns c2 and c3 of the real table C Columns x8 and x9 of View X It corresponds, respectively. If the column x8 of View X is observed, relation setting out of two, the column b5 of the real table B and the column c2 of the real table C, is carried out here. That is, the same close data will be in the column b5 of this real table B, and the column c2 of the real table C mutually.

[0012] When pro TOKORORU for constituting one view X from three above-mentioned real tables A, B, and C is described, it is as follows, for example.
create view viewX(x1,x2,x3,x4,x5,x6,x7,x8,x9)

as select a1, a2, a3, a4, b2, b3, b4, b5, c3 from TableA, TableB, and TableC where a1=b1 and a1=c1 and b5=c2 [0013 --]

However, when a certain retrieval is performed to DB which has such two or more real tables A, B, and C, the following inconvenience arises. that is, in the conventional DB system, since call appearance of all the real tables by which relation setting out is carried out is carried out and retrieval processing is performed, irrespective of on which real table desired data exist, the real tables A, B, and C serve as an object for retrieval altogether; and retrieval processing of each fruit table is performed in order according to the retrieval type from a user.

[0014] However, the data which it is going to search are the columns x8 and x9 on View X.

Supposing it is concerned, the column x8 of this view X Since it has common data in the column b5 of the real table B, and the column c2 of the real table C, even if it does not use the real table B, they are columns x8 and x9. It can refer to the real table C corresponding to both in practice. Moreover, columns x8 and x9 of this view X Since the column of a real table A throat is not supported, either, originally the retrieval to the real table A is also unnecessary.

[0015] That is, many real tables were combined beyond the need (join), and the large range was searched with the conventional DB system. Such processing not only lengthens the retrieval time of DB for a long time, but uses many memory areas beyond the need of the computer which constitutes a system, and it has a problem of making the performance of retrieval fall as a result.

[0016] Moreover, when a user searches DB, the join of all real tables surely occurs, but since a limit of the number of columns exists like a real table, more than physical constraint, a long view cannot be made from the view which RDBMS offers. Therefore, when seeing the contents of the long view beyond constraint, the custom-made application program which unifies the data for every fruit table and every fruit table had to be created each time, and the user had to be shown.

[0017] This invention aims at offering the structure which can search easily, without making a user conscious of DB server distributing in DB system which accomplishes in order to solve the above problems, and is constituted by decentralized DB and its server. Moreover, this invention always grasps the information about DB stored in each decentralized server, and also makes it the object to provide without accompanying the structure from which the newest information on the event of searching is acquired as a result by a user's load.

[0018] Moreover, this invention is a relational database system, and when searching by combining a table, it aims at offering the database system which can moreover stop and process the pulse duty factor of memory at a high speed. Moreover, it aims also at enabling it to make a long view exceeding physical constraint of a database.

[0019]

[Means for Solving the Problem] In the database system which the 1st one or more servers with which the database retrieval system of this invention searches live data to one or more databases and these databases were distributed on the network, and was constituted The metadata management tool which collects and manages the metadata about the live data stored in the one or more above-mentioned databases from the 1st one or more above-mentioned servers, It searches according to the demand from the user terminal connected on the above-mentioned network, and is characterized by having a metadata retrieval means to extract the metadata corresponding to the above-mentioned demand. Here, the above-mentioned metadata management tool and the above-mentioned metadata retrieval means may be established in the one or more 2nd different server from the 1st server of the above.

[0020] The place by which it is characterized [of this invention / other] is characterized by including the information which expresses the content of the live data in the above-mentioned database, or a 1st server's of the above existence location and the above-mentioned database at least in the above-mentioned metadata.

[0021] The place by which it is characterized [of others of this invention] the above-mentioned user terminal The means for inputting the retrieval conditions at the time of searching live data on the above-mentioned database using the retrieval result of the above-mentioned metadata given from the means for inputting the retrieval demand of the above-mentioned metadata, and the above-mentioned metadata retrieval means, It is characterized by having a means to transmit the retrieval conditions by which the input was carried out [above-mentioned] as a retrieval demand to the 1st server of the above shown by the metadata by which the extract was carried out [above-mentioned].

[0022] The place by which it is characterized [of others of this invention] is characterized by having a means to offer the form for not being based on the retrieval result in the above-mentioned metadata retrieval means, but inputting the above-mentioned retrieval conditions usable in common. The place by which it is characterized [of others of this invention], the 1st server of the above is characterized by having a conversion means to change the retrieval demand to the above-mentioned database transmitted from the above-mentioned user terminal into the format suitable for the database to access.

[0023] The place by which it is characterized [of others of this invention] is equipped with a metadata storage means for the 1st server of the above to create the metadata about the database which he manages, and to keep it, and the 2nd server of the above is characterized by having a means to acquire metadata, when the storing data within the above-mentioned metadata storage means are updated. Moreover, the 2nd server may be equipped with a means to acquire the storing data within the above-mentioned metadata storage means for every fixed time interval.

[0024] The database search method of this invention moreover, the metadata about the live data stored in each database which distributes and exists on a network The process collected and kept by the 2nd server through the 1st server which distributes and exists on the above-mentioned network, The process which extracts the metadata which agrees in a demand by searching to the metadata by which collection was carried out [above-mentioned], The process which inputs the retrieval conditions over the above-mentioned database based on the retrieval result of the above-mentioned metadata, It is characterized by having the process which emits the retrieval demand of the above-mentioned live data to the 1st server shown by the metadata by which the extract was carried out [above-mentioned], and the process at which the 1st server of the above performs a search of the above-mentioned live data according to the above-mentioned retrieval demand to the database corresponding to this.

[0025] The record medium of this invention Moreover, one or more user terminals and one or more databases, The 1st one or more servers which search live data to this database, In the database system which distributed and constituted on the network the 2nd one or more servers which collect and manage the metadata about the live data stored in the one or more above-mentioned databases from the 1st one or more above-mentioned servers When there are a function to collect the metadata of each distributed database by the 2nd server of the above through the 1st server of the above, and a retrieval demand from a user The function to extract the metadata which agrees in a demand by searching to the metadata by which collection was carried out [above-mentioned], The function which inputs the retrieval conditions over the above-mentioned database by the above-mentioned

user terminal based on the retrieval result of the above-mentioned metadata, and emits the retrieval demand of the above-mentioned live data to the 1st server shown by the metadata by which the extract was carried out [above-mentioned], It is characterized by recording the program for making a computer realize the function in which the 1st server of the above performs a search of the above-mentioned live data according to the above-mentioned retrieval demand.

[0026] Since this invention consists of the above-mentioned technical means, if a retrieval demand is emitted to the 2nd server which is carrying out collection management of the metadata about one or more databases, all the metadata corresponding to the demand will be extracted, and a user will be shown it. If a search is performed to the 2nd server even if two or more 1st server which manages a database and it exists on a network, it will not be because the metadata about which database it is, but all the metadata corresponding to a retrieval demand will be extracted. For this reason, if even the whereabouts of the 2nd server is known even if a user does not know where the database currently distributed and the 1st server are, he can get all the data that match a retrieval demand from one place. Thus, the 2nd server is equipped with a means to provide other computers with metadata, generalizes each database on a network simultaneously, and offers the same inlet port for the retrieval to all databases.

[0027] Since the information showing the content of the live data in a database, or a 1st server's existence location and a database is included in metadata at least according to other descriptions of this invention, the whereabouts of the 1st server which manages the database or it in which the live data corresponding to a retrieval demand exist can be simultaneously known by retrieval of metadata. Therefore, a user does not need to grasp the whereabouts of the 1st server which manages the database and it of the 2nd server which are being distributed that what is necessary is to carry out whereabouts and just to understand.

[0028] Since the user terminal was equipped with the means for inputting the retrieval conditions at the time of searching live data using the retrieval result of metadata, and a means transmit the inputted retrieval conditions to the 1st server as a retrieval demand according to the description of others of this invention, after getting to know the whereabouts of a database where desired live data exist by retrieval of metadata, retrieval conditions can input and a search of live data can perform.

[0029] The retrieval conditions according to a standard format can create, and the database of a different class which just came to publish and is distributed can abstract, without a user being conscious of each database currently distributed, since the 1st server was equipped with a means change into the format suitable for the database which accesses the retrieval demand to the database transmitted from the user terminal according to the description of others of this invention.

[0030] Since according to the description of others of this invention the 2nd server was equipped with the function which acquires metadata for every fixed time interval when metadata was updated by the 1st server or, the newest information on the event of searching will always be acquired as a result, and the metadata currently collected by the 2nd server becomes possible [corresponding flexibly to modification of a system etc.].

[0031] moreover, in other modes of the database system by this invention A table extract means to be the database system which refers to a relational database by combining two or more tables, and to extract one table containing the column for retrieval out of two or more above-mentioned tables, It has a column exclusion means by which the same content of data as the column of a table and it which were extracted by the above-mentioned table extract means performs processing to which the column of other tables which are in close is excepted from the object of an extract in subsequent processing. Processing by the above-mentioned table extract means and processing by the above-mentioned column exclusion means are repeatedly performed until all the columns for [above-mentioned] retrieval are analyzed, and it is characterized by making it combine the table by which the sequential extract was then carried out with the above-mentioned table extract means.

[0032] The place by which it is characterized [of this invention / other] is characterized by the above-mentioned table extract means extracting one table containing most columns for retrieval out of two or more above-mentioned tables.

[0033] The place by which it is characterized [of others of this invention] is further equipped with the metadata management tool which collects and manages the metadata about association of two or more tables, and the above-mentioned table extract means is characterized by performing extract

processing of a table based on the metadata in the above-mentioned metadata management tool.

[0034] The place by which it is characterized [of others of this invention] establishes further a retrieval means to search a housing according to a search key, and is characterized by performing retrieval processing to the table which was extracted by the above-mentioned table extract means and combined.

[0035] moreover, in other modes of the database search method of this invention In case it refers to a relational database by combining two or more tables Extract one table which contains the column for retrieval out of two or more above-mentioned tables, and after excepting the column of the extracted table, and the column of other tables on which the same content of data is in close As one more table is extracted for the remaining table except the table which carried out [above-mentioned] the extract Processing which extracts a table, and processing which excepts the column of the same data are repeatedly performed until all the columns for [above-mentioned] retrieval are analyzed, and it is characterized by making it combine one or more tables by which the sequential extract was then carried out.

[0036] The place by which it is characterized [of this invention / other] is characterized by extracting one table containing most columns for retrieval out of two or more above-mentioned tables, in case one table is extracted out of two or more above-mentioned tables. The place by which it is characterized [of others of this invention] is characterized by performing retrieval processing to one or more tables by which association was carried out [above-mentioned].

[0037] Moreover, a means to extract the table on which most columns for retrieval are contained out of two or more above-mentioned tables in case it refers to other modes of the record medium of this invention by combining two or more tables with a relational database, A means to except the column of other tables on which the same content of data as the column of a table and it which were extracted is in close in subsequent processing, Processing of each above-mentioned means is repeatedly performed until all the columns for [above-mentioned] retrieval are analyzed, and it is characterized by recording the program for making a computer realize a means to combine one or more tables by which the sequential extract was then carried out.

[0038] The place by which it is characterized [of this invention / other] establishes further a retrieval means to search a housing according to a search key, to the table which was extracted by the above-mentioned table extract means and combined, and is characterized by recording the program for making a computer realize each means.

[0039] It ceases to be considered as the object of not necessarily association (join) of all the tables that are treated as that to which the column with the content of the data same when it exists on the table on which columns with the same content of data differ mutually since this invention consists of the above-mentioned technical means belongs to any one table (for example, table made for there to be most columns for retrieval) in process of processing, and contain the same column. Moreover, the table on which the column for retrieval does not exist ceases to be extracted as an object table of a join. Thereby, it is lost that many tables are combined beyond the need.

[0040] Since according to other descriptions of this invention two or more tables are managed unitary by collection of the metadata about a join rather than are managed separately, if it sees from database system, it will be two or more tables by which the join was carried out, but if it sees from a user, it will become possible to make a long view exceeding physical constraint of the situation of one table, i.e., the number of columns of a database etc.

[0041]

[Embodiment of the Invention] Hereafter, 1 operation gestalt of this invention is explained based on a drawing.

(1st operation gestalt) Drawing 1 is the block diagram showing the notional configuration of the database system by the 1st operation gestalt, and drawing 2 is the block diagram showing the software and the hardware image of the database retrieval system concerned.

[0042] In drawing 1, 10 is a user terminal, carries the WWW (world wide web) browser 11, and performs the keyword input of retrieval, a retrieval demand, the display of a retrieval result, etc. on this WWW browser 11. The retrieval to meta-DB mentioned later and the retrieval to live data is specified on this WWW browser 11. It transmits a retrieval demand signal by retrieval demand transfer section 11b while this WWW browser 11 is equipped with GUI section 11a and retrieval

demand transfer section 11b as shown in drawing 2 , and it performs various actuation for retrieval by GUI section 11a.

[0043] 20 is a database (DB) and actual data are stored. This DB20 exists on [at least one or more] a network. Although the platform or DB application for searching to this DB20 are not asked, retrieval means, such as SQL (Structured Query Language : database language for relational DB(s) with table type DS), can perform data retrieval, for example.

[0044] 30 is DB server and carries HTTPD (Hyper Text Transfer Protocol)31 equipped with retrieval demand reception section 31a and metadata offer section 31b as shown in drawing 2 , and the retrieval activation section 32 which consists of DB network client. Fundamentally, although one DB server 30 is formed to one DB20, one DB server 30 may manage two or more DB20.

[0045] This DB server 30 answers a retrieval demand from a user terminal 10, searches DB20, and answers a retrieval result in a HTML (Hyper Text Markup Language) format to a user terminal 10. It has the role which absorbs the difference between different species DB by translating the retrieval demand from a user terminal 10 into the form suitable for DB20, and passing it in that case. The DB server 30 creates and stores the metadata 33 about the live data stored in DB20 which he has managed again.

[0046] As for metadata, the attribute of the data stored in DB20, a semantic content, an acquisition place, a storing location, etc. say the information for managing data here. With this operation gestalt, URL for accessing the content of data what kind of data DB20 has at least especially, and DB20 concerned is included. The DB server 30 provides the meta-DB server 40 with this metadata 33 according to the demand from the meta-DB server 40 mentioned later.

[0047] The example of the directory structure of the above-mentioned metadata 33 is shown in drawing 6 . This drawing 6 shows the example for which one DB server 30 has managed two or more DB20 (DB1, DB2, DB3, --), and it is shown in each directory of DB that the metadata file about that DB, the metadata file about the table which constitutes DB, and the metadata file about each column 1 in a table - n are included.

[0048] Drawing 7 shows the concrete content of the metadata file about Above DB as a representative. As shown in drawing 7 , as metadata of DB, each information on DBKEY, DBEXPL, DBMS, DBLIMIT, SERIAL, CHECK, RETRY, EMAIL, TBLFILE, DBNAME, and SQLURL is included. Hereafter, it explains one at a time about each of such information.

[0049] DBKEY It is a keyword about DB and the keyword "a demonstration and personnel" is described by here. DBEXPL is content explanation of DB and the explanation "personnel information" is described by here. DBMS is the identifier of DB system and the identifier of "OracleWorkgroupServer-7.3" is described by here. DBLIMIT It is the access restriction to DB and is described as "allow @foo.co.jp;deny all" here. That is, although access of a user with the address of "@foo.co.jp" is permitted, refusing the other user's access is described.

[0050] Moreover, SERIAL is the serial number of the metadata used for an updating check, and is described to be "19,971,225 million" here, and it is shown that metadata was updated on December 25, 1997. CHECK Time interval of the updating check of metadata [Second] it is -- the time amount of "3600 seconds" is described by here. RETRY Time interval of the retry at the time of failure of the updating check of metadata [Second] it is -- the time amount of "600 second" is described by here.

[0051] Moreover, EMAIL It is the mail address of the manager of DB and the address "dbnavi@foo.co.jp" is described by here. TBLFILE It is the file name the metadata about the table of DB is described to be, and the identifier of "tables.html" is described by here. DBNAME is the library-name of DB and the identifier of "demo@navi.foo.co.jp" is described by here. SQLURL is URL of the retrieval activation demand place to DB, and the URL "http://navi.foo.co.jp:8080 / servlet/DBNAVI/service" is described by here.

[0052] Moreover, although the metadata file and format of DB which were shown in drawing 7 about the metadata file of a table or the metadata file of a column although the graphic display was omitted are the same, two or more description of the metadata of a different content is carried out. Here, as metadata of a table, each information on COLFILE, TBLNAME, DBNAME, TBLOWNER, TBLNAME2, TBLKEY, TBLEXPL, TBLDATE, TBLMODIFY, NCOLS, NROWS, and TBLLIMIT is included. Hereafter, it explains one at a time about each of such information.

[0053] COLFILE A table name and DBNAME are DB names and that of the file name and TBLNAME the metadata about a column is described to be the same as that of what was described in the metadata file of DB shown in drawing 7 . The table name according [TBLNAME2] to Japanese and the keyword concerning [TBLKEY] a table according [TBLOWNER] to the owner name of a table, and TBLEXPL are content explanation of a table and TBLDATE. The date and time of creation of a table, and TBLMODIFY The updating timing of a table, and NCOLS The number of columns in a table, and NROWS The line count in a table and TBLLIMIT are information which shows the access restriction to a table.

[0054] Moreover, as metadata of a column, each information on COLNAME, DBNAME, TBLNAME, TBLOWNER, COLNAME2, CODEFILE, COLKEY, COLEXPL, COLHANDLER, COLHINFO, COLATTR, COLTYPE, COLUNIT, and COLSIZE is included. Hereafter, it explains one at a time about each of such information.

[0055] COLNAME It is a column name. Moreover, DBNAME is DB name and is the same as under the metadata file of DB. TBLNAME A table name and TBLOWNER are the owner names of a table, and are the same as under the metadata file of a table respectively. The column name according [COLNAME2] to Japanese and CODEFILE are information which shows the storing location of the metadata file about the code which shows the content of the column.

[0056] Moreover, COLKEY is a keyword about a column, and COLEXPL. Content explanation of a column, the approach handling [COLHANDLER / a column], and COLHINFO are the handling information on a column, and COLATTR. The constraint attribute of a column, and COLTYPE The type of the data stored in a column, and COLUNIT The unit of the data stored in a column, and COLSIZE It is the information which shows the size of the data stored in a column.

[0057] Moreover, as metadata of the above-mentioned code, each information on CODENAME, DBNAME, CODENAME2, CODEKEY, and CODEEXPL is included. Here, CODENAME is a code name, DBNAME is DB name, and it is the same as under the metadata file of DB.

CODENAME2 The code name in Japanese, and CODEKEY The keyword about a code and CODEEXPL are information which shows content explanation of a code.

[0058] Return and the above-mentioned metaDB server 40 collect each metadata 33 of DB20 to drawing 1 and drawing 2 from at least one or more DB servers 30 which exist on a network, and create meta-DB41 to them. The meta-DB Management Department 42 which consists of a meta-DB manager performs this creation and management of meta-DB41. The metadata 33 on the DB server 30 is periodically collected according to the demand from the meta-DB Management Department 42 at the time of renewal of the DB server 30 or metadata 33.

[0059] Moreover, the meta-DB server 40 carries HTTPD43 equipped with meta-DB retrieval reception section 43a and retrieval demand creation section 43b as shown in drawing 2 . If the retrieval demand to meta-DB41 from a user terminal 10 is, meta-DB retrieval reception section 43a will search the metadata which corresponds in response to it, and will reply to a user terminal 10 in a HTML format. According to the directions from the user who looked at the retrieval result of meta-DB41, and has answered further, retrieval demand creation section 43b creates the retrieval conditions published to the DB server 30, in order to search live data on DB20.

[0060] Actually, the user terminal 10 constituted as mentioned above, DB20, the DB server 30, and the meta-DB server 40 are connected to the network 50, as shown in drawing 2 . Although the configuration in which each device 10-40 was connected to every one network 50 is shown here, two or more these may exist, respectively. In a distributed DB system, more than one usually exist.

[0061] That is, a user terminal 10 exists on [one or more] a network 50. DB20 is not visible, although it sees from a user terminal 10 and one or more and one or more meta-DB servers 40 of the DB server 30 are also visible. Moreover, as mentioned above, DB20 exists on [one or more] a network 50. Physically, you may mount in the same equipment as the DB server 30. It may see from DB20 and the DB server 30 may exist how many.

[0062] Moreover, the DB server 30 also exists on [one or more] a network 50. It may see from the DB server 30 and DB20 may exist how many. In addition, metadata offer section 31b and metadata 33 are not equipped with the conventional DB server. Moreover, the meta-DB server 40 also exists on [one or more] a network 50. DB20 is not visible, although it may see from the meta-DB server 40 and two or more user terminals 10 and DB servers 30 may exist.

[0063] Although sequential connection was made and it was searching to one or more DB servers 30 conventionally when taking out the data of a request [be / they / any of DB20 currently distributed on a network 50 in this way], with this operation gestalt, it connects with the meta-DB server 40 newly prepared first, and DB20 in which the live data with which it is going to search and search metadata exist is got to know. Then, the retrieval conditions published to the DB server 30 corresponding to the DB20 are created, the retrieval condition is published from retrieval demand transfer section 11b to the DB server 30, and a retrieval result is obtained.

[0064] Below, actuation of the database system by this operation gestalt constituted as mentioned above is explained. As preparation before retrieval, the manager of the DB server 30 creates the metadata 33 of DB20 which the server takes charge of. The created metadata 33 is sent to the meta-DB server 40 according to the demand from the meta-DB server 40. The meta-DB server 40 collects each metadata 33 from two or more DB servers 30, and creates meta-DB41.

[0065] Next, first, when searching actually, when a user inputs a desired keyword, a search of metadata is performed to meta-DB41 of the meta-DB server 40. One or more metadata which agrees in the inputted keyword by this is extracted from meta-DB41. Since URL of corresponding DB20 or the DB server 30 is contained in metadata, it can choose whether it accesses to DB20 [which] by the ability of a user grasping DB20 in which the live data currently looked for exist at this event. Of course, it is also possible to access all searched DBs20.

[0066] The user who obtained the retrieval result of metadata creates the retrieval conditions published to the DB server 30, in order to search live data on DB20 next. A user terminal 10 is provided with the GUI actuation screen for creating this retrieval condition by the meta-DB server 40 based on the retrieval result of metadata etc. If a user pushes the GUI carbon button of retrieval activation after creating retrieval conditions, transfer direct will be carried out to the DB server 30, without the retrieval demand with the retrieval condition passing through the meta-DB server 40, and a search of live data will be performed. And the retrieval result is returned and displayed on a user terminal 10.

[0067] In addition, two or more DB servers 30 or two or more DB20 may be simultaneously contained in the retrieval result shown to a user terminal 10 from the meta-DB server 40. The GUI actuation screen for retrieval condition creation where it is provided from the meta-DB server 40 also in such a case is displayed in a fair predetermined format. Therefore, without being conscious of two or more dispersed DB servers 30 or two or more DB20, a user can create retrieval conditions and can publish it to the desired DB server 30 according to URL contained in the retrieval result of metadata.

[0068] As mentioned above, according to the database system of this operation gestalt, two or more things which match the inputted suitable keyword can be extracted from meta-DB41 by performing ambiguous retrieval which used metadata first. The metadata extracted here expresses the content of one or more DBs20 etc. briefly. Therefore, even if a user does not know where DB20 (DB server 30) currently distributed is, he can acquire easily all the information on DB20 which matches the keyword for which a user asks.

[0069] That is, a user can acquire the information on different DB20 from one place of the meta-DB server 40 altogether by one retrieval, without being conscious of DB20 (DB server 30) distributing and existing. since the whereabouts (URL) of extracted DB20 (DB server 30) is included in metadata and a user is shown this -- a user -- the whereabouts (URL) of the meta-DB server 40 -- a part -- **** -- what is necessary is just to be Therefore, it can be managed even if it does not do the troublesome activity of grasping all the DB servers 30 currently distributed and accessing in order one by one.

[0070] And as for the information on DB20 which exists on a network 50 (metadata), the newest data are always sent to the meta-DB server 40 by communication link periodical [between the DB server 30 and the meta-DB server 40]. Thereby, the newest information on the event of searching will be acquired as a result, and the content of meta-DB41 can perform exact data retrieval now. Updating inspection processing of this metadata is automatically performed between the DB server 30 and the meta-DB server 40. Therefore, a user needs to grasp neither registration of the data continuously performed by the DB server 30, nor deletion, the connection, cutting to the network 50 of DB server 30 the very thing, etc.

[0071] When metadata 33 is updated on the DB server 30, it is not actively sent to the meta-DB server 40 from the DB server 30, but he is trying to transmit with this operation gestalt according to the demand from the meta-DB server 40 furthermore. By doing in this way, the DB server 30 becomes independent of the meta-DB server 40 thoroughly. Therefore, it is not necessary to know to which meta-DB server 40 the DB server 30 will offer metadata. The meta-DB server 40 can rewrite meta-DB41 based on the metadata sent according to the demand of all the DB servers 30 to the meta-DB server 40 which have started.

[0072] In addition, although this operation gestalt explains the gestalt that there is only one meta-DB server 40 on a network 50, one or more meta-DB servers 40 may have more than one. If a mirror server with the information on the same content as the meta-DB server 40 or a different content is prepared, when traffic is dramatically crowded, for example, it can prevent that the reaction of the meta-DB server 40 to the demand from a user terminal 10 becomes slow.

[0073] Next, it explains in more detail using the flow chart which shows actuation of the database system by this operation gestalt mentioned above to drawing 3 - drawing 5. In addition, drawing 3 is a flow chart which shows the flow of the whole processing, drawing 4 is a flow chart which shows the flow of an update process (processing by the meta-DB manager) of meta-DB, and drawing 5 is the flow chart which showed a series of retrieval processings every user terminal 10, DB server 30, and meta-DB server 40.

[0074] In drawing 3, the manager of the DB server 30 creates and registers the metadata 33 about DB20 at step S1 first. Such metadata 33 can be referred to from other machines on a network 50 via HTTPD31 on the DB server 30. Accuracy and in order to enable it to carry out efficiently, metadata 33 is divided into two or more layers, and it enables it to create retrieval of meta-DB41 with this operation gestalt, as shown in drawing 6.

[0075] for example, with this operation gestalt, a table type is relational as DB20 -- it is considering as four layer configurations, DB layer, a table layer, a column layer, and a code layer, supposing DB. The information concerning [DB layer] the DB20 whole, the information concerning [a table layer] each table in DB20 (table), the information concerning ~~[a column layer] each train in a table~~ (each item), and a code layer describe the information about each value in a column. The content and keyword of each layer are contained in each layer, and URL of DB20 (issuance place of retrieval conditions) is contained in DB layer at least.

[0076] Next, at step S2, the manager of the meta-DB server 40 registers into a predetermined file information required for acquisition of metadata 33, i.e., each information on DB20 which the DB server 30 offers, from the DB server 30 according to which DB server 30 is supported. An item required for registration is URL of each DB layer metadata file of DB20 at least.

[0077] If each information on DB20 to support is registered, the meta-DB server 40 will acquire the metadata 33 about each DB20 by which registration was carried out [above-mentioned] from the DB server 30 at step S3, and will register it into meta-DB41 by step S4. That is, meta-DB41 is created by collecting metadata 33 altogether from two or more DB servers 30 registered, and processing data, in order to make it easy to serve toward a user based on them.

[0078] Here, the manager of the meta-DB server 40 should just add one information on corresponding DB20 into an above-mentioned file to newly add DB20 to support. If it carries out like this, after that, the meta-DB server 40 will read metadata 33 from the DB server 30 automatically, and will update meta-DB41. Thus, with this operation gestalt, the flexible system which can perform an addition, deletion, etc. of DB20 to support very simply can be offered.

[0079] The preparation before retrieval by the above is completed. When actually searching after that, it is step S5 first and a user applies an inquiry to the meta-DB server 40 using WWW browser 11. Then, the meta-DB server 40 searches with step S6 DB20 which agrees in an inquiry of a user using meta-DB41. And the page (GUI actuation screen) of retrieval condition creation form is constituted from a step S7 using the retrieval result and metadata, and it sends to a user terminal 10.

[0080] A user judges whether it is that to which this retrieval result is seen at step S8, and a demand is satisfied, and if he cannot be satisfied, he redoes retrieval by inputting return and a different keyword from last time into step S5 etc. On the other hand, if it can be satisfied with a retrieval result, it will progress to step S9. In step S9, a user creates the retrieval conditions used in case live data are searched on extracted DB20 using the page of the shown retrieval condition creation form,

and publishes to the DB server 30 as a retrieval demand.

[0081] As retrieval conditions, when DB is assumed, various kinds of conditions besides the conditions the information [which table in above-mentioned relational corresponding DB20 and] on which location of which column to retrieve can be inputted, for example. It can be freely decided with application what kind of retrieval conditions are inputted. In addition, relational -- when treating DB, the retrieval demand to the DB server 30 is created and published according to the format of SQL. The issuance place of a retrieval demand is shown as URL into metadata, and is automatically published by the issuance place to which a retrieval demand corresponds by button grabbing of retrieval activation.

[0082] The carrier beam DB server 30 is step S10 about a retrieval demand, and a retrieval demand is translated into the form suitable for DB20. That is, it is created by one regular format which exists regardless of the class of DB20 currently distributed on a network 50 in case retrieval conditions are created between a user terminal 10 and the meta-DB server 40. So, in case a retrieval demand is actually published to each DB20, he is trying to change a standard retrieval demand into the form where he can understand each DB20.

[0083] For this reason, a user should just publish by creating the retrieval conditions which followed the standard format using the above-mentioned retrieval condition creation form shown from the meta-DB server 40, without being conscious of each DB20 currently distributed. That is, if it sees from a user, every DB20 on a network 50 looks the same, and abstraction of a different class currently distributed of DB20 can be attained.

[0084] The carrier beam DB server 30 publishes a retrieval demand (SQL) for the retrieval demand translated as mentioned above to DB20 instead of a user at step S11, and a search of live data is performed. And the retrieval result is returned and expressed to a user terminal 10 as step S12, and a series of retrieval processings are ended.

[0085] Next, the update process (step S3 of drawing 3 and processing of step S4) of meta-DB41 by the meta-DB server 40 is explained in detail using drawing 4. In drawing 4, URL and the inspection interval of the DB server 30 to support are first acquired from the configuration file in the meta-DB Management Department 42 at step S21.

[0086] An inspection interval shows the time interval at the time of publishing the collection demand of metadata 33 from the meta-DB server 40 periodically to the DB server 30. This may be beforehand set up within the meta-DB server 40, and when the manager of the DB server 30 creates metadata 33, it is described in metadata 33, and transmits to the meta-DB server 40, and you may make it store it in an above-mentioned configuration file.

[0087] At step S22, based on the set-up inspection interval, it stands by until it becomes the inspection time amount of the DB server 30, if it becomes inspection time amount, it will progress to step S23, and the information on DB layer of metadata 33 is acquired from the DB server 30. It judges whether metadata 33 had modification by containing in DB layer the serial number data counted up whenever the content of metadata 33 has modification, and inspecting this at step S24.

[0088] Here, when there is no modification in metadata 33, it returns to step S22 that it should stand by until it becomes the following inspection time amount. On the other hand, when there is modification, it progresses to step S25 and the information on the metadata 33 is acquired from the DB server 30. At step S26, it judges whether metadata 33 was updated, and if it is updating settled, the new metadata 33 will be saved at step S27, and the updating time amount will be recorded.

[0089] And if it judges whether all the metadata 33 about DB20 under inspection was investigated and there is non-investigated metadata 33 at the following step S28, in order to acquire it, it will return to step S25. If it finishes investigating all the metadata 33, and judges whether there are some which became inspection time amount among other DB servers 30 and is at step S29, it will return to step S23 and same processing will be performed.

[0090] If it finishes acquiring altogether the metadata 33 about DB20 which corresponds from all the DB servers 30 that became inspection time amount as mentioned above, meta-DB41 will be updated based on those information at step S30. And at step S31, the next inspection time amount of the DB server [finishing / inspection] 30 is recorded, and it returns to processing of step S22.

[0091] Next, a series of retrieval processings (processing of steps S5-S12 of drawing 3) performed by a user terminal 10, the DB server 30, and the meta-DB server 40 are explained in detail using

drawing 5 . In drawing 5 , a user connects a user terminal 10 to the meta-DB server 40 through a network at step S41 first. In response, the meta-DB server 40 is step S42, and sends the retrieval form of meta-DB41 to a user terminal 10 with HTML format.

[0092] Next, a user is step S43, specifies a keyword using above-mentioned retrieval form, and publishes a retrieval demand to the meta-DB server 40. In response, the meta-DB server 40 is step S44, performs the full-text search by the inputted keyword to meta-DB41, and returns the retrieval result to a user terminal 10 with HTML format by step S45. A user evaluates the retrieval result by step S46, and if he is satisfactory, he will tell that to the meta-DB server 40.

[0093] The meta-DB server 40 constitutes the creation form of retrieval conditions to DB20 from a step S47 with HTML format using the retrieval result and metadata of meta-DB41, and sends it to a user terminal 10. A user is step S48, specifies the retrieval conditions of DB20 using the shown retrieval condition creation form, and notifies to the meta-DB server 40. The meta-DB server 40 is step S49, and sends the notified retrieval conditional statement (SQL) and URL of the DB server 30 corresponding to DB20 which is the transmission place of this to a user terminal 10.

[0094] Retrieval conditional statement (SQL) is published as a retrieval demand to the DB server 30 shown in this by URL which the carrier beam user terminal 10 is step S50, and was notified. The carrier beam DB server 30 is step S51 about this retrieval demand, and that retrieval demand is changed into the form suitable for corresponding DB20. And the DB server 30 publishes a retrieval demand (SQL) to DB20 at step S52, performs a search of live data, is continuing step S53 and transmits the obtained retrieval result to a user terminal 10. A user terminal 10 acquires a retrieval activation result at step S54, and ends a series of retrieval processings.

[0095] In addition, although the distributed DB system which accessed the Internet and constituted the user terminal 10, DB20, the DB server 30, and the meta-DB server 40 from the above operation gestalt was shown, the network to connect is not restricted to the Internet. For example, it is possible to apply to WAN other than the Internet (Wide Area Network), LAN (Local AreaNetwork) or intranet, etc.

[0096] moreover, relational [as an example of DB20.] with the above operation-gestalt --although DB was mentioned as the example, the target DB is not restricted to this by this invention. Moreover, the content of the data treated by DB can also be considered as various gestalten, such as text data, image data, and voice data.

[0097] (2nd operation gestalt) Next, the 2nd operation gestalt of this invention is explained based on a drawing. Drawing 8 is the block diagram showing the example of 1 configuration of the database system by this operation gestalt. The database system of this operation gestalt shown in drawing 8 is possible also for using it by independent [this], and can also be used combining the 1st operation gestalt shown in drawing 1 .

[0098] It can realize, when using it combining the 1st operation gestalt, for example, when the DB server 30 of drawing 1 is equipped with the functional configuration of those other than database 20 shown with the alternate long and short dash line into drawing 8 . Moreover, the DB server 30 of drawing 1 is equipped only with the search engine 60 of drawing 8 , and the joint table generation means 65, and you may make it the meta-DB server 40 of drawing 1 equipped with the metadata management tool 69 and the metadata storage means 70 of drawing 8 .

[0099] moreover, when applying the database system of this operation gestalt combining the 1st operation gestalt, as metadata to be used Other DB names (JOINABLE) by which the join guarantee is offered are added into the file of DB layer. The map information (JOINMAP) which described the response with two or more real tables and the column with which it is expressed on the virtual table mentioned later is added into the file of a table layer, and a real column name (REALCOL) is added into the file of a column layer.

[0100] Below, each functional configuration shown in drawing 8 is explained. 60 is a search engine and searches the data in a database 20 based on the retrieval conditions demanded in the SQL sentence. Two or more real tables 21, 22, and 23 and are stored in the database 20. These real tables 21, 22, and 23 and are stored in the format corresponding to constraint of RDBMS, and can search each fruit table now from a search engine 60.

[0101] 69 is a metadata management tool and has managed two or more above-mentioned real tables 21, 22, and 23 and the metadata about The attribute of each fruit tables 21, 22, and 23 and the

data stored in, a semantic content, an acquisition place, the storing location of metadata, etc. are the same as that of what said the information for managing data, for example, was stated with the operation gestalt of the above 1st here. This metadata is acquired from a database 20 periodically or irregularly, and is memorized by the metadata storage means 70. The metadata storage means 70 is made to memorize the metadata management tool 69, or it is being begun to read this metadata and it is used for it.

[0102] For example, in drawing 8, since the real tables 21, 22, and 23 and are stored in the database 20, the metadata management tool 69 acquires the column name of the real tables 21, 22, and 23 and the column of .. which constitutes a table name and each table, and memorizes it as real table metadata 71 for the metadata storage means 70. Thus, since the information made to memorize is the gestalt which can be briefly indicated also by text data, a manager etc. may create manually and may make it memorize.

[0103] Moreover, the information about association of two or more tables is also managed as virtual table metadata 72 by this metadata management tool 69. For example, if it is the metadata of the virtual table made from two real tables 21 and 22, the table name of the real tables 21 and 22 and all the column names of each table are memorized as metadata. Similarly, if it is the virtual table made from three real tables 21, 22, and 23, three table names and all the column names of each table are memorized.

[0104] 65 is a joint table generation means and consists of a number of columns maximum table extract means 66, same data selection column exclusion means 67, and a table join means 68. The joint table generation means 65 has two or more real tables 21, 22, and 23 and the function which extracts only a required column from and makes a new table virtually based on the metadata managed with the metadata management tool 69. In addition, although the activity which combines a predetermined column as well as the conventional view is done with this operation gestalt, as for the conventional view, in the virtual table combined with this operation gestalt, gestalten differ.

[0105] The number of columns maximum table extract means 66 extracts the real tables 21, 22, and 23 and a real table with most columns with which the data of which it is going to search are stored from inside based on the metadata managed with the above-mentioned metadata management tool 69. When the column of the same content of data as the column contained in the extracted real table at this time overlaps and exists also in other real tables, that column is treated as what carries out a group only into the extracted real table.

[0106] Moreover, the same data selection column exclusion means 67 performs processing for excepting the column with which close is in the content of data same whenever one real table is extracted by the above-mentioned number of columns maximum table extract means 66 as the column of the real table extracted among each column contained in the remaining real table in table join processing in which it is carried out continuously henceforth.

[0107] The number of columns maximum table extract means 66 performs again processing which extracts the real table of the number max of columns for the remaining real table except the real table from which the column which corresponds with the same above-mentioned data selection column exclusion means 67 was excepted, and which is a condition and was extracted by last time. Like the following, the processing which extracts a real table with most columns for retrieval, and the processing from which the same data as the column of the extracted real table except the column with which close is are repeated, and are performed.

[0108] The table join means 68 creates one logical joint table (virtual table) from one or more real tables by combining one or more real tables by which the sequential extract was carried out with the number of columns maximum table extract means 66. The information on this joint table is managed as joint table metadata 73 by the metadata management tool 69.

[0109] As mentioned above, since the same column is treated as that to which the content of data stored although the real tables contained differ belongs to any one real table mutually, with this operation gestalt, many tables are not combined by the table join means 68 beyond the need. Moreover, the real table on which the data to search do not exist is not extracted as an object table of a join.

[0110] Thereby, when a user searches a database, it can avoid making an unnecessary real table into the object of a join, and it can make one joint table only from a necessary minimum real table.

Moreover, a long view can be made now exceeding physical constraint of a database by collecting and managing two or more real tables 21, 22, and 23 and the metadata about a join of ..., to one place of the metadata management tool 69. That is, if it sees from two or more tables by which the join was carried out when seeing from the database management system (DBMS:Database Management System), and a user, the situation of one table is made.

[0111] In drawing 8, SQL74 inputted into the joint table generation means 65 is SQL which a user is going to search actually and inputs. At this time, it can search to the virtual table managed with the metadata management tool 69. That is, a user can input retrieval conditions, without being conscious of constraint of the number of columns. If SQL74 inputted by the user is an instruction of wanting to search to range which is over constraint of the number of columns of RDBMS, hereafter, it will perform the above processings with the joint table generation means 65, and will discharge SQL75 for search engines.

[0112] SQL75 for search engines is outputted from the joint table generation means 65 with the gestalt to which a search engine 60 can refer. SQL75 for search engines makes applicable to retrieval the joint table in the condition that the unnecessary part was removed and the necessary minimum column was chosen. Since this information is the information managed with the metadata management tool 69, for example, a joint table is the joint table metadata 73 of consisting of which column of a real table, and which column of other real tables, a search engine 60 will search based on this.

[0113] Next, actuation of the joint table creation by this operation gestalt constituted as mentioned above is explained in more detail using drawing 9 - drawing 12. Here, the data which it is going to search when searching the same database as having been shown in drawing 13 are the columns x1, x4, x8, and x9 on View X as an example. Suppose that it was what is concerned.

[0114] As shown in drawing 9, for the column x4 of View X, the columns x8 of View X are [the column x1 of View X] the columns b5 and c2 of the real tables B and C to the column a4 of the real table A in the columns a1, b1, and c1 of the real tables A, B, and C. The column x9 of View X is equivalent to the column c3 of the real table C, respectively. if possible in joint processing of this operation gestalt, the number of join tables at the time of retrieval decreases -- as -- four columns x1, x4, x8, and x9 for retrieval It is alike, respectively, and it receives and every one corresponding real column is selected.

[0115] Namely, four columns x1, x4, x8, and x9 of View X The number of the columns on the real tables A and B with relation and C is seven in all (links 1-7 shown by the arrow head); and they select four columns (link) by processing described below from these a total of seven columns (link).

[0116] First, a real table with most (the number of the columns containing the data for retrieval) links is extracted out of each fruit tables A, B, and C. It sets to the initial state before performing a table join, and they are columns a1 and a4 on the real table A. On two and the real table B, they are columns b1 and b5. On two and the real table C, three of columns c1, c2, and c3 are contained, and since there are most links of the real table C (the number of selection columns), this is adopted as shown in drawing 10.

[0117] And while adopting the eclipse ***** links 4, 6, and 7 with a string as this adopted real table C, the links 1, 3, and 5 corresponding to the columns a1, b1, and b5 with which the same data as the columns c1, c2, and c3 in the real table C are in close are deleted. This treats the columns x1, x8, and x9 of View X as what carries out a group only into the real table C. In addition, the link 2 which remained here is transferred to subsequent processings as it is.

[0118] Next, processing which extracts a real table with most (the number of selection columns for retrieval) links for the remaining real tables A and B except the adopted real table C is performed again. In this case, the number of links to the real table A is one piece, and while adopting the real table A as shown in drawing 11 since the number of links to the real table B is zero piece, the eclipse ***** link 2 with a string is adopted as this. Since the unsolved number of links becomes zero piece by this, processing is ended.

[0119] Columns x1, x4, x8, and x9 searched out of three real tables A, B, and C as a result of the above processing as shown in drawing 12 The real table A and the real table C are adopted as a real table contained. Moreover, while adopting four links 2, 4, 6, and 7 out of seven links 1-7 stretched by three real tables A, B, and C, the remaining links 1, 3, and 5 are deleted. And join conditions are

added between two adopted real tables A and C. In this way, the new table made from four columns of the column a4 of the real table A and the columns c1, c2, and c3 of the real table C is generated. This is the joint table (virtual table) described previously.

[0120] Thus, with this operation gestalt, by performing SQL analysis advanced as the so-called preceding paragraph of DBMS, only a join required for retrieval can be generated and the number of tables to combine can be reduced. Thereby, moreover, the generating time amount and the retrieval response time of a retrieval signal (Query) can be made quick, without using many memory areas beyond the need of a computer.

[0121] In addition, although the case where the number of real tables was three here was explained, this invention is not limited to this number. Generally, a join becomes complicated, the load of a computer becomes very heavy so that the number of real tables increases, but especially the database system of this operation gestalt is effective when there are many real tables in this way.

[0122] Moreover, so that each operation gestalt mentioned above may operate various kinds of devices so that the function may be realized As opposed to the computer in the equipment connected with these various devices, or a system Although carried out by operating the various above-mentioned devices according to the program which supplied the program code of the software for realizing the function of the above-mentioned operation gestalt, and was stored in the computer (CPU or MPU) of the system or equipment You may constitute in hardware.

[0123] In this case, the function of the operation gestalt which the program code of the above-mentioned software itself mentioned above will be realized, and the record medium which stored the means for supplying that program code itself and its program code to a computer, for example, this program code, constitutes this invention. ~~As a record medium which memorizes this program code, a floppy disk, a hard disk, an optical disk, a magneto-optic disk, CD-ROM, a magnetic tape, the memory card of a non-volatile, ROM, etc. can be used, for example.~~

[0124] Moreover, by performing the program code with which the computer was supplied, also when the function of an above-mentioned operation gestalt is not only realized, but the function of an above-mentioned operation gestalt is realized in collaboration with OS (operating system) or other application software etc. with which the program code is working in a computer, it cannot be overemphasized that this program code is contained in the operation gestalt of this invention.

[0125] Furthermore, after stored in the memory with which the functional expansion unit by which the supplied program code was connected to the functional add-in board and the computer of a computer is equipped, also when the function of the operation gestalt which the CPU with which the functional add-in board and functional expansion unit are equipped based on directions of the program code performed a part or all of actual processing, and mentioned above by the processing is realized, it cannot be overemphasized that it is contained in this invention.

[0126]

[Effect of the Invention] This invention collects and manages the metadata about the live data stored in one or more databases to the 2nd server, as mentioned above. Since it constituted so that the metadata which agrees in a retrieval demand by performing a search to this 2nd server might be extracted If a search is performed to the 2nd server even if two or more 1st server which manages a database and it exists, all the metadata corresponding to a retrieval demand will be extracted, and the thing of it can be carried out. For this reason, a user can find easily the database with which desired live data are stored, without doing the troublesome activity of being able to acquire the information on a different database from one place of the 2nd server altogether, grasping the whole of the 1st server currently distributed, and accessing in order one by one, without being conscious of the database (the 1st server) distributing and existing.

[0127] Since the 1st server was equipped with a means change into the format suitable for the database which accesses the retrieval demand to the database transmitted from the user terminal according to the description of others of this invention, the retrieval conditions according to a standard format create, what is necessary is that just to publish becomes impossible, the database of a different class are distributing can abstract, and a user can simplify retrieval of a user, without being conscious of each database currently distributed.

[0128] Since according to the description of others of this invention the 2nd server was equipped with the function which acquires metadata for every fixed time interval when metadata was updated

by the 1st server or The metadata currently collected by the 2nd server can respond also to modification of a system flexibly while the newest information on the event of searching will always be acquired as a result and it can perform exact data retrieval now. Moreover, since an update process of such metadata is performed automatically, a user needs to grasp neither the registration of data continuously performed by the 1st decentralized server, nor deletion, and the connection and cutting to the network of the 1st server itself, and a user's burden can be mitigated.

[0129] The processing which extracts one table containing the column for retrieval out of two or more tables according to the description of others of this invention, The same content of data as the column of a table and it which were extracted repeats the processing to which the column of other tables which are is excepted from the object of an extract in subsequent processing, and performs close. Since it was made to combine the table by which the sequential extract was then carried out with the above-mentioned table extract means Although the existing tables differ, they treat a column with the same content of data as a thing belonging to any one table, and can be prevented from combining many of tables of each other beyond the need. Moreover, it can avoid making into the object of association the table on which the column for retrieval does not exist, consequently it can generate one joint table only on a necessary minimum table. Therefore, an unnecessary table can be searched now in the excepted comparatively narrow range, and can offer the database system which can moreover stop and process the pulse duty factor of memory at a high speed.

[0130] Since according to the description of others of this invention the metadata about association of two or more tables is collected and managed and it was made to perform extract processing of a table based on this metadata, two or more tables can be managed unitary by collection of metadata, and a long view can be made exceeding physical constraint of the number of columns of a database etc.

[Translation done.]

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3. In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1] In the database system with which the 1st one or more servers which search live data to one or more databases and these databases were distributed and constituted on the network The metadata management tool which collects and manages the metadata about the live data stored in the one or more above-mentioned databases from the 1st one or more above-mentioned servers, Database system characterized by having a metadata retrieval means to extract the metadata which searches according to the demand from the user terminal connected on the above-mentioned network, and agrees in the above-mentioned demand.

[Claim 2] For the 1st server of the above, the above-mentioned metadata management tool and the above-mentioned metadata retrieval means are database system according to claim 1 characterized by being prepared in the one or more 2nd different server.

[Claim 3] Database system according to claim 1 or 2 characterized by including the information which expresses the content of the live data in the above-mentioned database, or a 1st server's of the above existence location and the above-mentioned database at least in the above-mentioned metadata.

[Claim 4] A means for the above-mentioned user terminal to input the retrieval demand of the above-mentioned metadata, The means for inputting the retrieval conditions at the time of searching live data on the above-mentioned database using the retrieval result of the above-mentioned metadata given from the above-mentioned metadata retrieval means, Database system given in any 1 term of claims 1-3 characterized by having a means to transmit the retrieval conditions by which the input was carried out [above-mentioned] as a retrieval demand to the 1st server of the above shown by the metadata by which the extract was carried out [above-mentioned].

[Claim 5] Database system according to claim 4 characterized by having a means to offer the form for not being based on the retrieval result in the above-mentioned metadata retrieval means, but inputting the above-mentioned retrieval conditions usable in common.

[Claim 6] The 1st server of the above is database system according to claim 4 or 5 characterized by having a conversion means to change the retrieval demand to the above-mentioned database transmitted from the above-mentioned user terminal into the format suitable for the database to access.

[Claim 7] It is database system given in any 1 term of claims 2-6 characterized by having equipped the 1st server of the above with a metadata storage means to create and keep the metadata about the database which he manages, and equipping the 2nd server of the above with a means to acquire metadata when the storing data within the above-mentioned metadata storage means are updated.

[Claim 8] It is database system given in any 1 term of claims 2-6 characterized by having equipped the 1st server of the above with a metadata storage means to create and keep the metadata about the database which he manages, and equipping the 2nd server of the above with a means to acquire the storing data within the above-mentioned metadata storage means for every fixed time interval.

[Claim 9] A table extract means for the above-mentioned database to be a relational database and to extract one table containing the column for retrieval out of two or more tables in the above-mentioned database, A column exclusion means to perform processing which excepts the column of other tables on which the same content of data as the column of a table and it which were extracted by the above-mentioned table extract means is in close from the object of an extract in subsequent

processing, It has the table coupling means which combines the table by which the sequential extract was carried out with the above-mentioned table extract means when processing by the above-mentioned table extract means and processing by the above-mentioned column exclusion means were repeatedly performed until all the columns for [above-mentioned] retrieval were analyzed. Database system given in any 1 term of claims 1-8 characterized by searching the above-mentioned live data to the table combined by the above-mentioned table coupling means.

[Claim 10] The process which collects and keeps the metadata about the live data stored in each database which distributes and exists on a network by the 2nd server through the 1st server which distributes and exists on the above-mentioned network, The process which extracts the metadata which agrees in a demand by searching to the metadata by which collection was carried out [above-mentioned], The process which inputs the retrieval conditions over the above-mentioned database based on the retrieval result of the above-mentioned metadata, The process which emits the retrieval demand of the above-mentioned live data to the 1st server shown by the metadata by which the extract was carried out [above-mentioned], The database search method characterized by having the process at which the 1st server of the above performs a search of the above-mentioned live data according to the above-mentioned retrieval demand to the database corresponding to this.

[Claim 11] One or more user terminals, one or more databases, and the 1st one or more servers that search live data to this database, In the database system which distributed and constituted on the network the 2nd one or more servers which collect and manage the metadata about the live data stored in the one or more above-mentioned databases from the 1st one or more above-mentioned servers When there are a function to collect the metadata of each distributed database by the 2nd server of the above through the 1st server of the above, and a retrieval demand from a user The function to extract the metadata which agrees in a demand by searching to the metadata by which collection was carried out [above-mentioned], The function which inputs the retrieval conditions over the above-mentioned database by the above-mentioned user terminal based on the retrieval result of the above-mentioned metadata, and emits the retrieval demand of the above-mentioned live data to the 1st server shown by the metadata by which the extract was carried out [above-mentioned], The record medium which is characterized by recording the program for making a computer realize the function in which the 1st server of the above performs a search of the above-mentioned live data according to the above-mentioned retrieval demand and in which computer reading is possible.

[Claim 12] The 1st one or more servers which search live data to one or more databases and these databases, In the database system which distributed and constituted the 2nd one or more different servers from the 1st server of the above on the network When the metadata about the database which one it created by the 1st server of the above has managed is updated By acquiring the metadata to which the 2nd server of the above corresponds The record medium which is characterized by recording the program for making a computer realize the function to collect and manage the above-mentioned metadata from the 1st one or more above-mentioned servers to the 2nd server of the above and in which computer reading is possible.

[Claim 13] The 1st one or more servers which search live data to one or more databases and these databases, In the database system which distributed and constituted the 2nd one or more different servers from the 1st server of the above on the network When the 2nd server of the above acquires the metadata about the database which the it created by the 1st server of the above has managed for every fixed time interval The record medium which is characterized by recording the program for making a computer realize the function to collect and manage the above-mentioned metadata from the 1st one or more above-mentioned servers to the 2nd server of the above and in which computer reading is possible.

[Claim 14] One or more user terminals, one or more databases, and the 1st one or more servers that search live data to this database, In the database system which distributed and constituted on the network the 2nd one or more servers which collect and manage the metadata about the live data stored in the one or more above-mentioned databases from the 1st one or more above-mentioned servers The function to extract the metadata which searches according to the demand from the above-mentioned user terminal, and agrees in the above-mentioned demand from the 2nd server of the above, The function for inputting the retrieval conditions at the time of searching live data on the above-mentioned database using the retrieval result of the above-mentioned metadata, The record

medium which is characterized by recording the program for making a computer realize the function to transmit the retrieval conditions which carried out [above-mentioned] the input as a retrieval demand to the 1st server of the above shown by the metadata which carried out [above-mentioned] the extract and in which computer reading is possible.

[Claim 15] In the database system with which the 1st one or more servers which search live data to one or more databases and these databases were distributed and constituted on the network While creating and keeping the metadata about the database which he manages in the 1st server of the above The function changed into the format suitable for the database which accesses the retrieval demand sent from the function to offer this according to the demand from the outside, and the user terminal connected on the above-mentioned network, The record medium which is characterized by recording the program for making a computer realize the function to perform a search of the above-mentioned live data to the above-mentioned database according to the retrieval demand by which conversion was carried out [above-mentioned] and in which computer reading is possible.

[Claim 16] A table extract means to be the database system which refers to a relational database by combining two or more tables, and to extract one table containing the column for retrieval out of two or more above-mentioned tables, It has a column exclusion means by which the same content of data as the column of a table and it which were extracted by the above-mentioned table extract means performs processing to which the column of other tables which are in close is excepted from the object of an extract in subsequent processing. Database system characterized by making it combine the table by which performed processing by the above-mentioned table extract means, and processing by the above-mentioned column exclusion means repeatedly until all the columns for [above-mentioned] retrieval were analyzed, and the sequential extract was then carried out with the above-mentioned table extract means.

[Claim 17] The above-mentioned table extract means is database system according to claim 16 characterized by extracting one table containing most columns for retrieval out of two or more above-mentioned tables.

[Claim 18] It is the database system according to claim 16 or 17 which is further equipped with the metadata management tool which collects and manages the metadata about association of two or more tables, and is characterized by the above-mentioned table extract means performing extract processing of a table based on the metadata in the above-mentioned metadata management tool.

[Claim 19] Database system given in any 1 term of claims 16-18 characterized by performing retrieval processing to the table which established further a retrieval means to search a housing according to a search key, and the sequential extract was carried out with the above-mentioned table extract means, and was combined.

[Claim 20] In case it refers to a relational database by combining two or more tables Extract one table which contains the column for retrieval out of two or more above-mentioned tables, and after excepting the column of the extracted table, and the column of other tables on which the same content of data is in close As one more table is extracted for the remaining table except the table which carried out [above-mentioned] the extract The database search method characterized by making it combine one or more tables by which performed repeatedly processing which extracts a table, and processing which excepts the column of the same data until all the columns for [above-mentioned] retrieval were analyzed, and the sequential extract was then carried out.

[Claim 21] The database search method according to claim 20 characterized by extracting one table containing most columns for retrieval out of two or more above-mentioned tables in case one table is extracted out of two or more above-mentioned tables.

[Claim 22] The database search method according to claim 20 or 21 characterized by performing retrieval processing to one or more tables by which association was carried out [above-mentioned].

 [Claim 23] A means to extract the table on which most columns for retrieval are contained out of two or more above-mentioned tables in case it refers to a relational database by combining two or more tables, A means to except the column of other tables on which the same content of data as the column of a table and it which were extracted is in close in subsequent processing, The record medium which is characterized by recording the program for operating a computer as a means to combine one or more tables by which performed processing of each above-mentioned means repeatedly until all the columns for [above-mentioned] retrieval were analyzed, and the sequential extract was then carried out and in which computer reading is possible.

[Claim 24] The record medium which is characterized by recording the program for establishing further a retrieval means to search a housing according to a search key, to the table which was extracted by the above-mentioned table extract means and combined, and operating a computer as each means and in which computer reading according to claim 23 is possible.

[Translation done.]

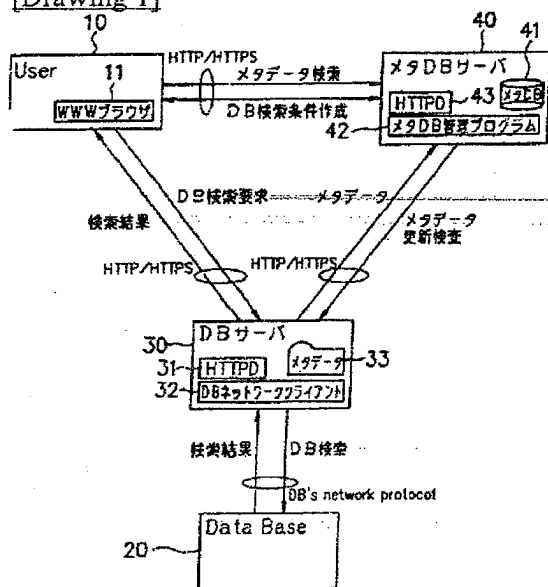
* NOTICES *

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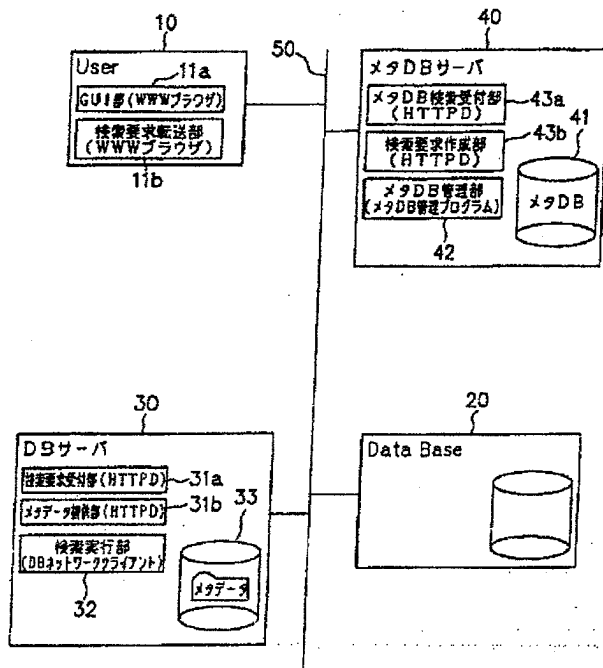
1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DRAWINGS

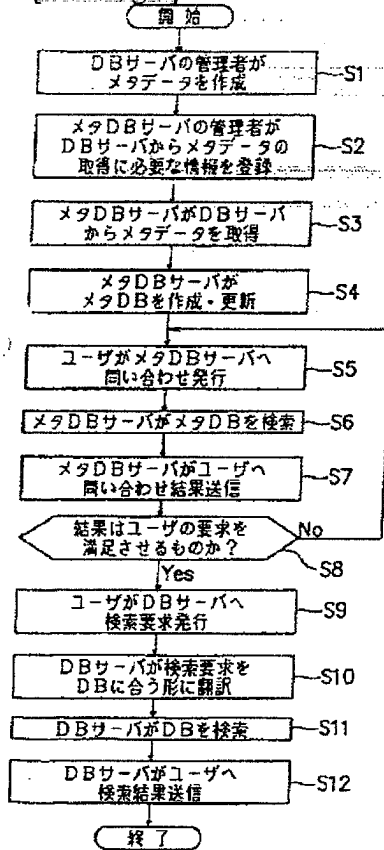
[Drawing 1]



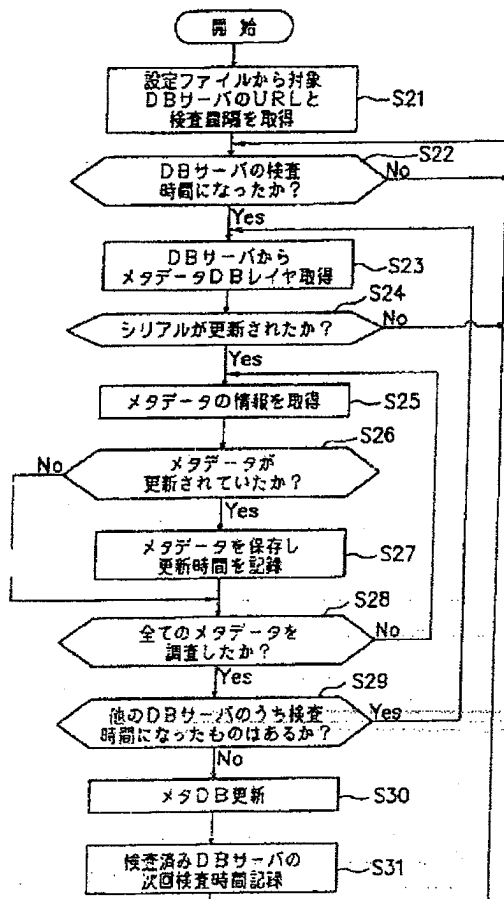
[Drawing 2]



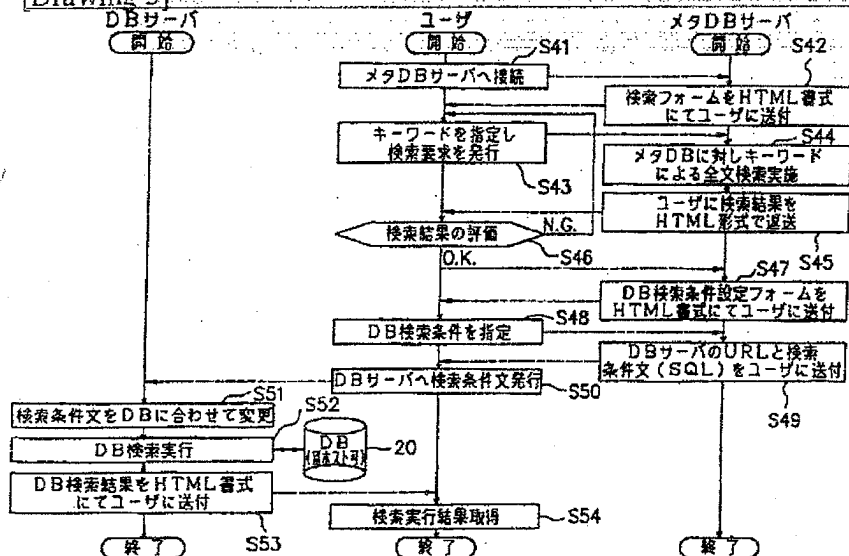
[Drawing 3]



[Drawing 4]

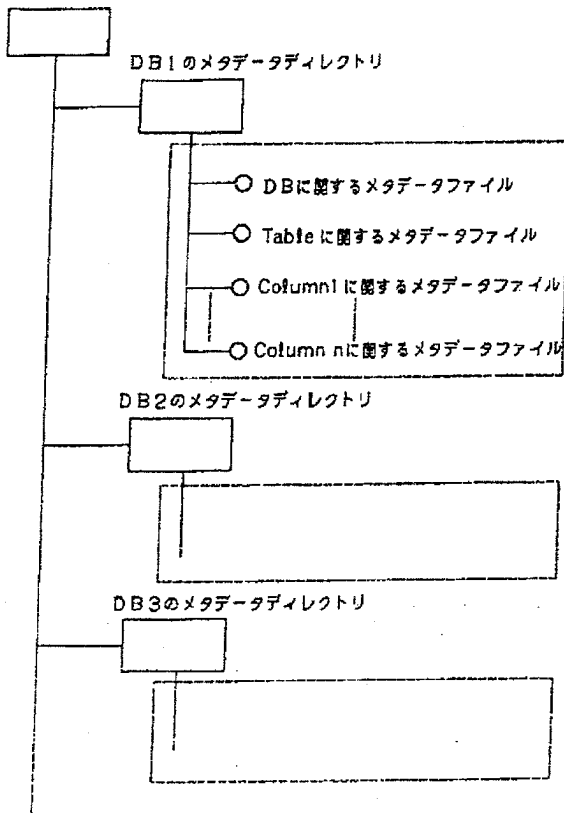


[Drawing 5]



[Drawing 6]

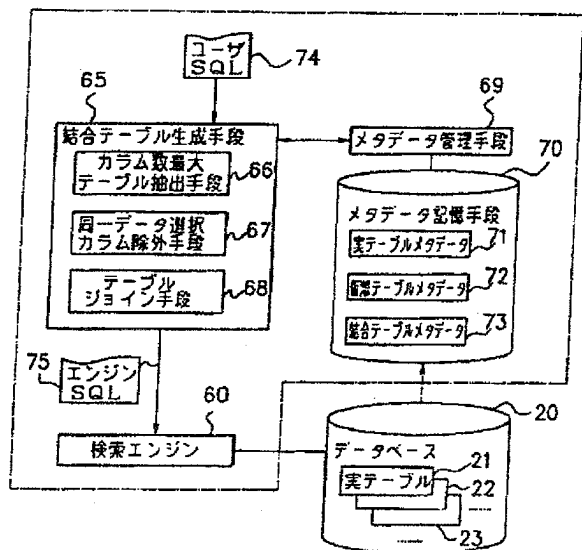
メタデータディレクトリ



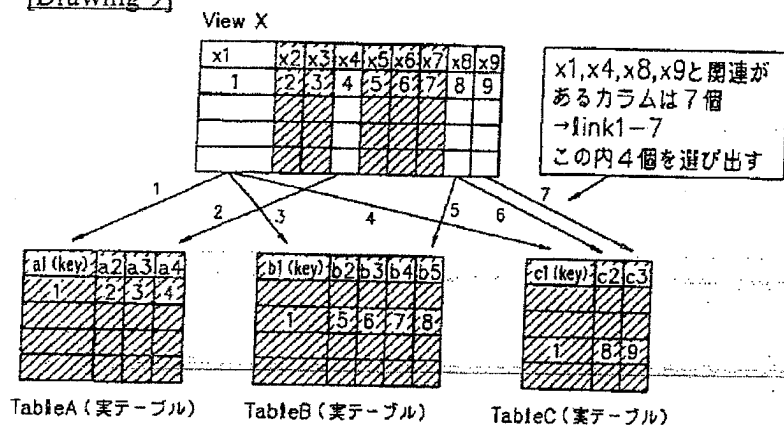
[Drawing 7]

LAYER DATABASE
 FORMAT DBKEY,DBEXPL,DBMS,DBLIMIT,SERIAL,CHECK,RETRY,EMAIL,TBLFILE,DBNAME,SQLURL
 DATA デモ;社員,¥
 社員情報,¥
 OracleWorkgroupServer-7.3,¥
 allow @foo.co.jp;deny all,¥
 19971225000000,¥
 3600,¥
 600,¥
 dbnavi@foo.co.jp,¥
 tables.html,¥
 demo@navi.foo.co.jp,¥
 http://navi.foo.co.jp:8080/servlet/DBNAV/service

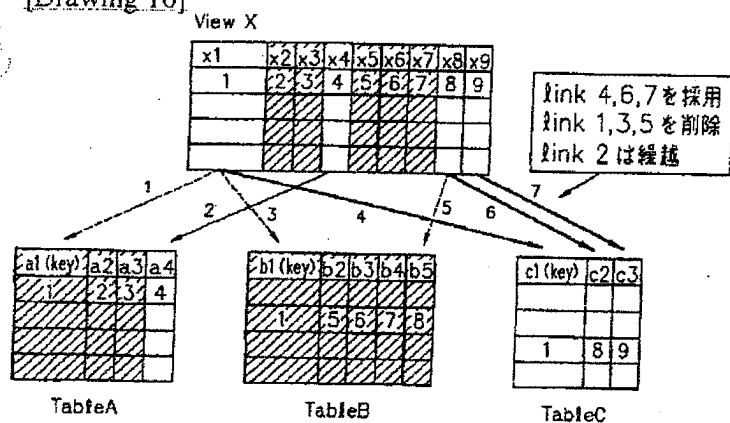
[Drawing 8]



[Drawing 9]



[Drawing 10]



[Drawing 11]

View X

x1	x2	x3	x4	x5	x6	x7	x8	x9
1	2	3	4	5	6	7	8	9

link 2を採用
未解決リンク数0
解決終了

2

a1 (key)	a2	a3	a4
1	2	3	4

TableA

b1 (key)	b2	b3	b4	b5
1	5	6	7	8

TableB

c1 (key)	c2	c3
1	8	9

TableC

[Drawing 12]

x1	x2	x3	x4	x5	x6	x7	x8	x9
1	2	3	4	5	6	7	8	9

7個の候補から,
link 2,4,6,7を採用
link 1,3,5を削除

2

4

6

7

a1 (key)	a2	a3	a4
1	2	3	4

b1 (key)	b2	b3	b4	b5
1	5	6	7	8

c1 (key)	c2	c3
1	8	9

[Drawing 13]

TableA (実テーブル)

a1 (key)	a2	a3	a4
1	2	3	4

TableB (実テーブル)

b1 (key)	b2	b3	b4	b5
1	5	6	7	8

TableC (実テーブル)

c1 (key)	c2	c3
1	8	9

View X

x1	x2	x3	x4	x5	x6	x7	x8	x9
1	2	3	4	5	6	7	8	9

[Translation done.]